Small Business Innovation Research/Small Business Tech Transfer

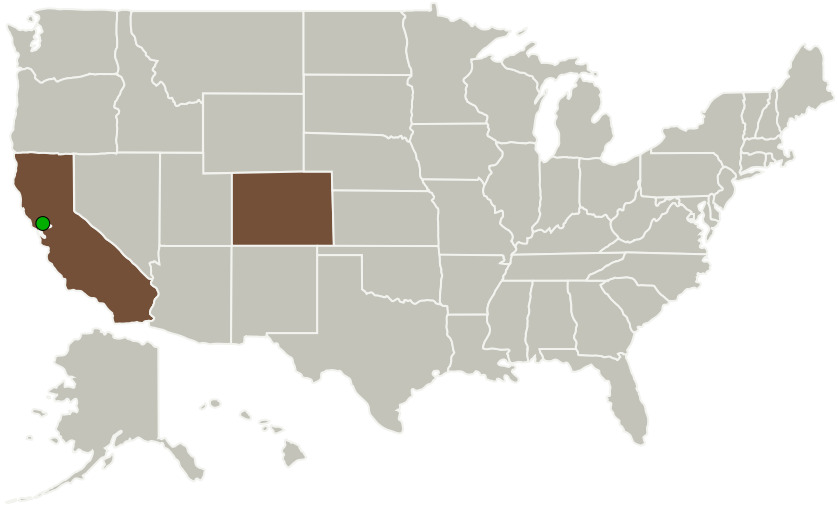
Operationally Responsive Spacecraft Subsystem, Phase I

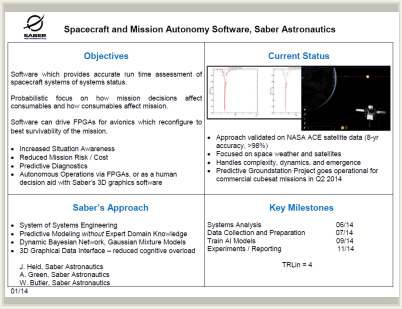
Completed Technology Project (2014 - 2014)

Project Introduction

Saber Astronautics proposes spacecraft subsystem control software which can autonomously reconfigure avionics for best performance during various mission conditions. The approach is to construct performance metrics from spacecraft health and welfare telemetry and learn their relationships in a probabilistic, multi-modal model called a "System Map". In this way the relationships between consumables, mission performance, and spacecraft subsystems can be learned in the same data driven model. The significance of the innovation is the ability for immediate, accurate real time assessment of the spacecraft systems-of-systems performance. Immediate assessment leads to immediate action, so the System Map is useful for any spacecraft reconfiguration task, spacecraft repair task, or mission decision assessment. It can be used in a fully autonomous, decentralized fashion by implanting on an FPGA as investigated in this proposal, or as a decision aid for a human crew.

Primary U.S. Work Locations and Key Partners





Operationally Responsive Spacecraft Subsystem Project Image

Table of Contents

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Organizations Performing Work	Role	Type	Location
Saber Astronautics, LLC	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Austin, Texas
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

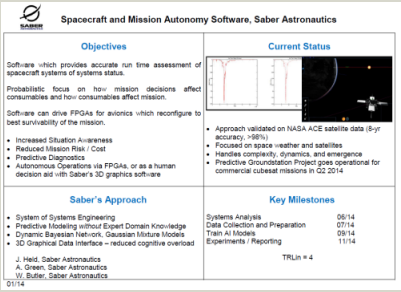
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137757)*

Images



Project Image
Operationally Responsive Spacecraft Subsystem Project Image
(https://techport.nasa.gov/image/132187)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Saber Astronautics, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

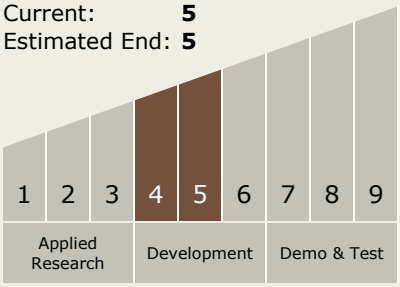
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jason Held

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.2 Activity and Resource Planning and Scheduling

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System